Alessandro Casa

ASSOCIATE PROFESSOR · FACULTY OF ECONOMICS AND MANAGEMENT · FREE UNIVERSITY OF BOZEN-BOLZANO

Piazzetta dell'Università, 39031, Brunico (BZ), Italy

✉ alessandro.casa@unibz.it | ⌂ https://alessandrocasa.github.io | ⌨ https://github.com/AlessandroCasa

Research Interests

Keywords: Latent variable models, Nonparametric statistics, Density-based clustering, Density estimation, Computational statistics, Dimensionality reduction techniques, Graphical models, Bayesian Inference, Penalized estimation, Chemometrics.

Professional Experience

❯ CURRENT POSITION

Oct 2024 -	**Associate Professor of Statistics**, (STAT-01/A)
	Faculty of Economics and Management, Free University of Bozen-Bolzano, Italy

❯ PAST POSITIONS

Feb 2024 - Sep 2024	**Senior Assistant Professor**, (RTDB - SECS-S/01)
	Department of Economics, University of Bergamo, Italy
Jan 2022 - Jan 2024	**Junior Assistant Professor**, (RTDA - SECS-S/01)
	Faculty of Economics and Management, Free University of Bozen-Bolzano, Italy
Mar 2020 - Dec 2021	**Postdoctoral Research Fellow**, (supervisor: T.B. Murphy)
	School of Mathematics and Statistics, University College Dublin, Ireland
	Affiliated with: Vistamilk SFI Research Centre, Insight SFI Research Centre
Nov 2019 - Feb 2020	**Research Assistant Pending Viva**, (supervisor: T.B. Murphy)
	School of Mathematics and Statistics, University College Dublin, Ireland
	Affiliated with: Vistamilk SFI Research Centre, Insight SFI Research Centre

Awards & Scholarships

2023	**National Qualification for Associate Professor**, (ASN II fascia, Statistics, SC 13/D1)
2023	**PhD Student/Young Researcher Paper Award for outstanding contribution to the field of Classification, Clustering and Data Analysis**, CLADAG - Classification and Data Analysis Group
2022	**Best contribution by a young researcher**, Italian Statistical Society (14th Scientific Meeting)
2016	**Doctoral Scholarship**, University of Padova

Education

University of Padova *Padova (Italy)*
PHD IN STATISTICS *Oct 2016 - Sep 2019*
- Thesis: Climbing modes and exploring mixtures: a journey in density-based clustering
- Advisor: Prof. G.Menardi, Co-Advisor: Prof. J.E. Chacòn

University of Padova *Padova (Italy)*
MASTER DEGREE IN STATISTICAL SCIENCES *Oct 2014 - Sep 2016*
- Thesis: Semi-supervised detection of collective anomalies using non-parametric methods with an application to particle physics (in italian)
- Grade: 110/110 cum laude
- Advisor: Prof. G. Menardi

University of Padova
BACHELOR DEGREE IN STATISTICS, ECONOMICS AND FINANCE
- Thesis: Dimension reduction for model-based clustering: a simulation study and an application to genetic data (in italian)
- Grade: 110/110 cum laude
- Advisor: Prof. G. Menardi

Padova (Italy)
Oct 2011 - Jul 2014

Visiting periods

University of Cote d'Azur, Laboratory J.A. Dieudonnè
VISITING PHD SCHOLAR
- Advisor: Prof. C. Bouveyron

Nice (France)
Oct 2018 - Dec 2018

University of Perugia, Department of Economics
VISITING PHD SCHOLAR
- Advisor: Prof. L. Scrucca

Perugia (Italy)
Apr 2018

University of Cambridge, Department of Pure Mathematics and Mathematical Sciences
VISITING PHD SCHOLAR
- Advisor: Prof. R. Samworth

Cambridge (UK)
Oct 2017 - Dec 2017

Presentations

❯ SEMINARS

Mar 2024 | Brown Bag Seminar. University of Bergamo

May 2023 | Mathematics fot Data Science, AI and ML Seminar Series. University of Trento

Feb 2023 | Working Group on Statistical Learning. University College Dublin

Feb 2022 | Statistics Seminar Series. Trinity College Dublin

Feb 2021 | Working Group on Statistical Learning. University College Dublin

Jul 2020 | Vistamilk Spectroscopy Research Meeting. Online

Feb 2020 | Working Group on Statistical Learning. University College Dublin

❯ INVITED TALKS

Dec 2024 | [CMStat24] 18th International Conference on Computational and Methodological Statistics. London/Online

Jul 2024 | [WG-MBC24] Working Group on Model-Based Clustering. Bertinoro (FC)

Jun 2024 | [SIS24] 52nd Scientific Meeting of the Italian Statistical Society. Bari

Sep 2023 | [CLADAG23] SIS Classification and Data Analysis Group. Salerno

Jul 2023 | [WG-MBC23] Working Group on Model-Based Clustering. Pittsburgh

Dec 2022 | Workshop on Statistical Learning and Econometrics. Bolzano

Dec 2022 | [CMStat22] 15th International Conference of the ERCIM Working Group. London/Online

Sep 2022 | Vistamilk Science Foundation Ireland Site Review. Online

Sep 2022 | [ECDA22] European Conference on Data Analysis. Naples

Aug 2022 | [COMPSTAT22] 24th International Conference on Computational Statistics. Bologna

Jun 2022 | [SIS22] 51st Scientific Meeting of the Italian Statistical Society. Caserta

Dec 2021 | [CMStat21] 14th International Conference of the ERCIM Working Group. Online

Mar 2021 | Vistamilk Annual Conference. Online

Oct 2020 | Vistamilk Science Foundation Ireland Site Review. Online

Sep 2019 | [CLADAG19] SIS Classification and Data Analysis Group. Cassino (FR)

Jul 2019 | [EMS19] European Meeting of Statisticians. Palermo

❯ Contributed talks and poster

Oct 2021 | [WG-MBC21] Working Group on Model-Based Clustering. Athens

Sep 2019 | [CLADAG21] SIS Classification and Data Analysis Group. Online

Jun 2021 | [SIS21] 50th Scientific Meeting of the Italian Statistical Society. Online

Mar 2021 | [CASI21] 41st Conference on Applied Statistics in Ireland. Online

Jul 2019 | [WG-MBC19] Working Group on Model-Based Clustering. Wien

Sep 2018 | [ASPD] Workshop on Advanced Statistics for Physics Discovery. Padova

Sep 2018 | [MBC2] Workshop on Model-Based Clustering and Classication. Catania

Jul 2018 | [ECDA18] European Conference on Data Analysis. Paderborn

Jun 2018 | [SIS18] 49th Scientific Meeting of the Italian Statistical Society. Palermo

Jun 2018 | [ISNPS] International Society for Nonparametric Statistics. Salerno

Jun 2017 | [SIS17] Intermediate conference of the Italian Statistical Society. Florence

❯ Chair & Discussant

Jun 2024 | [SIS24] 52nd Scientific Meeting of the Italian Statistical Society
Session "Advanced statistical methods to analyze complex data". Bari

2020 - 2024 | Chair of several sessions at the Vistamilk Science Foundation Ireland Site Review
and at the International Workshop on Spectroscopy and Chemometrics

Teaching Activities

from 24/25 - present	**Statistical Methods for Business Analysis (english)**, Lecturer, MSc in Data Analytics for Economics and Management, MSc in Entrepreneurship and Innovation (36hrs)	*unibz*
from 24/25 - present	**Research Methods and Experimental Design (italian)**, Lecturer, MSc in Tourism Management (36hrs)	*unibz*
from 24/25 - present	**Statistics for Tourism, Sport and Event Management (italian)**, Lecturer, BSc in Tourism Sport and Event Management (54hrs)	*unibz*
a.y. 23/24	**Statistics (italian)**, Lecturer BSc in Mechanical Engineering (48hrs)	*unibg*
a.y. 22/23	**High-dimensional Econometric Methods for Big Data (english)**, Lecturer PhD in Economics and Finance (8hrs)	*unibz*
from 22/23 - to 23/24	**Statistics for Tourism, Sport and Event Management (italian)**, Teaching Assistant, BSc in Tourism Sport and Event Management (18hrs)	*unibz*
a.y. 22/23	**Statistics (italian)**, Teaching Assistant BSc in Economics and Management (18hrs)	*unibz*
from 21/22 - to 22/23	**Statistical Methods for Business Analysis (english)**, Lecturer, MSc in Entrepreneurship and Innovation (52hrs, 54hrs)	*unibz*
a.y. 19/20	**STAT20060 - Statistics & Probability**, Lecturer, Level 2 (9hrs)	*ucd*
a.y. 19/20	**STAT20060 - Statistics & Probability**, Teaching Assistant, Level 2	*ucd*
a.y. 19/20	**STAT30270 - Statistical Machine Learning**, Teaching Assistant, Level 3	*ucd*
a.y. 18/19	**Statistica Iterazione (italian)**, Specialist lecture "Bike sharing in Paris: a case study", MSc in Statistical Sciences	*unipd*

Students Supervision

2025	**Alice Guglielmino**, BSc in Economics and Management, Free University of Bozen-Bolzano (co-supervised with prof. D. Ferrari)
2024	**Elisa Borrini**, MSc in Mathematical Engineering, Politecnico di Milano (co-supervisor, main supervisor: prof. A. Cappozzo)
2024	**Jacopo Gardella**, MSc in Mathematical Engineering, Politecnico di Milano (co-supervisor, main supervisors: prof. R. Argiento, prof. A. Pini)
2023	**Isabel Franchini**, MSc in Entrepreneurship and Innovation, Free University of Bozen-Bolzano
2023	**David Bottai**, MSc in Entrepreneurship and Innovation, Free University of Bozen-Bolzano (co-superivsor, main supervisor: prof. A. Narduzzo)
2019	**Giulia Pascali**, MSc in Statistical Sciences, University of Padova (co-superivsor, main supervisor: prof. G. Menardi)

Funding and Grants

Jan 2025 - Dec 2027	**Principal Investigator**, "SIERRA - Advanced Statistical Methods for Spectral Data", Start-up fund, Free University of Bozen-Bolzano (€50k)
Jan 2022 - Jan 2024	**Member of the research group**, "Analisi di dati ad alta dimensionalità per processi decisionali sostenibili", (CUP I51B21004310005), scientific supervisor: Prof. D. Ferrari
Nov 2019 - Dec 2021	**Member of the research group**, "Insight Science Foundation Ireland Research Centre for Data Analytics" (ref. no. SFI/12/RC/2289_P2), scientific supervisor: Prof. T.B. Murphy
Nov 2019 - Dec 2021	**Member of the research group**, Vistamilk - Research grant from Science Foundation Ireland and the Department of Agriculture, Food and Marine on behalf of the Government of Ireland (grant 16/RC/3835), scientific supervisor: Prof. T.B. Murphy
2019	**Member of the research group**, "Approfondimenti su metodi di clustering basati sulla densità", scientific Research Project DOR (prot. DOR1944143), scientific supervisor: Prof. G. Menardi
2018	**Member of the research group**, "Bandwith selection in nonparametric density estimation for clustering purposes", scientific Research Project DOR (prot. DOR1898215), scientific supervisor: Prof. G. Menardi
2016 - 2019	**Member of the research group**, "AMVA4NP - Advanced Multivariate Analysis for New Physics Searches at the Large Hadron Collider", Marie Sklodowska Curie - Innovative Training Network (Horizon 2020), scientific supervisor: Prof. G. Menardi

Service & Outreach

> ❯ SERVICE

a.y. 23/24	**Member of the Admission Board**, MSc in Data Analytics for Economics and Management, Free University of Bozen-Bolzano
Jan 2022 - Jan 2024	**Member of the Selection committee**, Evaluation and ranking of the applications for Teaching contract, Lecturing assistant and Teaching assistant positions, Free University of Bozen-Bolzano
2022 - 2023	**Member of the degree council**, MSc in Entrepreneurship and Innovation, Free University of Bozen-Bolzano
2016 - 2020	**Elected representative of PhD Students and Postdoctoral researcher**, Faculty Board, University of Padova
2016 - 2019	**Elected representative of PhD Students**, Doctoral Board of the Grad School, University of Padova

❯ Outreach

2022-2023	**Organising committee of the Math & Stat area**, "Le mille e una scienza", youth-oriented science festival in Bolzano
2020	**Participant**, "I'm a scientist - Get me out of here", event in Ireland connecting school students with scientists
2016 & 2019	**Participant**, "Notte europea dei ricercatori", University of Padova

❯ Organization of Scientific Events

Jan 2025 -	**Member of the organising committee**, "Data Crunch at Lunch", Statistics, econometrics and ML seminar series at the Free University of Bozen-Bolzano
Apr 2024	**Member of the organising committee**, 4th edition of the "International Workshop on Spectroscopy and Chemometrics", (Fermoy, Ireland)
Dec 2022	**Member of the organising committee**, "Workshop on statistical learning and econometrics - Methodological advancements and applications", (Bolzano)
Apr 2022	**Member of the organising committee**, 2nd edition of the "International Workshop on Spectroscopy and Chemometrics", (Dublin, Ireland)
Apr 2021	**Academic lead of the organising committee**, 1st edition of the "International Workshop on Spectroscopy and Chemometrics", (online)
Jul 2020 - Nov 2024	**Member of the organising committee**, Monthly Vistamilk Spectroscopy Research Meeting

❯ Events participation

Jun 2018	**Start Up Research - Follow up**, Follow up meeting where research groups presented and discussed the scientific output of their works, (Palermo)
Jun 2017	**Start Up Research**, Meeting where small research groups of young scholars, advised by senior researchers, were asked to develop innovative methods to analyze a common dataset, (Siena)
Jun 2017	**Stats Under the Stars 3**, Hackathon, organizers: University of Florence, Italian Statistical Society (Florence)
Sep 2015	**Stats Under the Stars 1**, Hackathon, organizers: University of Padova, Italian Statistical Society (Florence)
Jun 2015	**Data Science Game**, Hackathon, organizers: Google, Capgemini (Paris)

❯ Editorial Activity

Referee for: Advances in Data Analysis and Classification, Annals of Applied Statistics, Canadian Journal of Statistics, Computational Statistics and Data Analysis, Electronic Journal of Statistics, Food Analytical Methods, Journal of Classification, Journal of Computational and Graphical Statistics, Journal of Dairy Science, Journal of Royal Statistical Society: Series C, Journal of Statistical Software, Knowledge-based Systems, Mathematics, New England Journal of Statistics in Data Science, R Journal, Scientific Reports, Social Indicators Research, Stat, Statistical Analysis and Data Mining, Statistics and Computing, Statistics and Probability Letters, Statistics in Medicine, WIREs Computational Statistics.

❯ Memberships

2021 -	**Member of the Italian Statistical Society (SIS)**, Affiliated with Classification and Data Analysis Group (CLADAG), Research Group for Statistical Applications to Environmental Problem (GRASPA), young SIS (ySIS)
2021 -	**Member of the Irish Statistical Association (ISA)**, Affiliated with the young ISA (yISA)

Languages

Italian: mother tongue

English: C1, Certificate of the Language center of the Free University of Bozen-Bolzano

German: A2, Goethe zertifikat

Publications

Articles under Review

Cappozzo, A. & **Casa, A.** (2024+). Model-based clustering for covariance matrices via penalized Wishart mixture models. *arXiv preprint arXiv:2408.17040.*

Casa, A., Ferrari, D. & Huang, Z. (2024+). High-dimensional covariance estimation by pairwise likelihood truncation. *arXiv preprint arXiv:2407.07717.*

Articles in Refereed Journals (Statistics)

Cappozzo, A., **Casa, A.** & Fop, M. (2024). Sparse model-based clustering of three-way data via lasso-type penalties. *Journal of Computational and Graphical Statistics, (in press)*

Ferraccioli, F., **Casa, A.** & Stefanucci, M. (2024). An adaptive functional regression framework for spatially heterogeneous signals in spectroscopy. *Journal of the Royal Statistical Society: Series C*, 73(5), 1370-1388.

Casa, A., Cappozzo, A. & Fop, M. (2022). Group-wise shrinkage estimation in penalized model-based clustering. *Journal of Classification*, 39(3), 648-674.

Casa, A., O'Callaghan, T.F. & Murphy, T.B. (2022). Parsimonious Bayesian Factor Analysis for modelling latent structure in spectroscopy data. *Annals of Applied Statistics*, 16(4), 2417–2436

Casa, A. & Menardi, G. (2021). Nonparametric semi-supervised classification with application to signal detection in high energy physics. *Statistical Methods & Applications*, 31(3), 531–550

Casa, A., Bouveyron, C., Erosheva, E. & Menardi, G. (2021). Co-clustering of time-dependent data via the Shape Invariant Model. *Journal of Classification*, 38(3), 626-649

Casa, A., Scrucca, L. & Menardi, G. (2021). Better than the best? Answers via model ensemble in density-based clustering. *Advances in Data Analysis and Classification*, 15(3), 599-623

Casa, A., Chacón, J.E. & Menardi, G. (2020). Modal clustering asymptotics with applications to bandwidth selection. *Electronic Journal of Statistics*, 14(1), 835–856

Articles in Refereed Journals (Cross-disciplinary)

Frizzarin, M., Hayes, E., **Casa, A.** & Berry, D.P. (2025). Comparison of the mid-infrared spectra and prediction equations developed from morning and evening milk samples from twice-a-day milked dairy cows. *Journal of Dairy Science*, 108(2), 1573-1583

Frizzarin, M., Visentin, G., Ferragina, A., Hayes, E., Bevilacqua, A., Dhariyal, B., Domijan, K., Khan, H., Ifrim, G., Le Nguyen, T., Meagher, J., Menchetti, L., Singh, A., Whoriskey, S., Williamson, R., Zappaterra, M. & **Casa, A.** (2023). Classification of cow diet based on milk mid infrared spectra: a data analysis competition at the "International workshop on spectroscopy and chemometrics 2022". *Chemometrics and Intelligent Laboratory Systems*, 104755.

Frizzarin, M., Gormley, I.C., **Casa, A.** & McParland, S. (2021). Selecting milk spectra to develop equations to predict milk technological traits. *Foods*, 10(12), 3084

Stakia, A., Dorigo, T., Banelli, G., Bortoletto, D., **Casa, A.**, de Castro, P., Delaere, C., Donini, J., Finos, L., Gallinaro, M., Giammanco, A., Held, A., Jimenez Morales, F., Kotkowski, G., Liew, S.P., Maltoni, F., Menardi, G., Papavergou, I., Saggio, A., Scarpa, B., Strong, G.C., Tosciri, C., Varela, J., Vischia, P. & Weiler, A. (2021). Advanced multi-variate analysis methods for new physics searches at the Large Hadron Collider. *Reviews in Physics*, 7, 100063.

Frizzarin, M., Bevilacqua, A., Dhariyal, B., Domijan, K., Ferraccioli, F., Hayes, E., Ifrim, G., Konkolewska, A., Le Nguyen, T., Mbaka, U., Ranzato, G., Singh, A., Stefanucci, M. & **Casa, A.** (2021). Mid infrared spectroscopy and milk quality traits:

a data analysis competition at the "International Workshop on Spectroscopy and Chemometrics 2021". *Chemometrics and Intelligent Laboratory Systems*, 219, 10442

Frizzarin, M., O'Callaghan, T.F., Murphy, T.B., Hennessy, D. & **Casa, A.** (2021). Application of machine learning methods to milk mid infrared spectra for discrimination of cows milk from pasture or TMR diets. *Journal of Dairy Science*, 104(12), 12394-12402

Frizzarin, M., Gormley, I.C., Berry, D.P., Murphy, T.B., **Casa, A.**, Lynch, A. & McParland, S. (2021). Predicting dairy cow milk quality traits from routinely available milk spectra using statistical machine learning methods. *Journal of Dairy Science*, 104(7), 7438–7447

❯ Refereed discussions

Casa, A., Fop, M. & D'Angelo, S. (2024). Contributed discussion on: "Sparse Bayesian factor analysis when the number of factors is unknown" by Frühwirth-Schnatter, S., Hosszejni, D.& Freitas Lopes, H. *Bayesian Analysis, (in press)*

Casa, A., Fop, M. & Murphy, T.B. (2021). Contributed discussion on: "Centered partition processes; informative priors for clustering" by Paganin, S., Herring, A.H., Olshan, A.F. & Dunson, D.B. *Bayesian Analysis*, 16(1), 301–370

❯ Book chapters

Casa, A., Cappozzo, A. & Fop, M. (2023). Penalized Model-Based Clustering with Group-Dependent Shrinkage Estimation. In: *Building Bridges between Soft and Statistical Methodologies for Data Science. SMPS 2022. Advances in Intelligent Systems and Computing,* vol 1433. Springer. `https://doi.org/10.1007/978-3-031-15509-3_10`

Cabassi, A., **Casa, A.**, Farcomeni, A., Fontana, M., Russo, M. (2018). Three testing perspectives on connectome data. *Studies in Neural Data Science, Springer Volume 'Proceedings in Mathematics & Statistics'*, ISBN-9783030000394.

❯ Ph.D thesis

Casa, A. (2020). Climbing modes and exploring mixtures: a journey in density-based clustering. PhD Thesis, University of Padova, `https://hdl.handle.net/10863/43031`

❯ Refereed conference proceedings

Casa, A., Murphy, T.B. & Fop, M. (2024). Sparse partial membership models with applications in food science. *Methodological and Applied Statistics and Demography II - SIS 2024, Short Papers, Solicited Sessions,* ISBN: 9783031643507

Gardella, J., Carone, R., Ciarulli, S., Francescon, N., Freddi, M., Garlanda, E., **Casa, A.** & Pini, A. (2024). Bayesian models for registration of functional data. *Methodological and Applied Statistics and Demography IV - SIS 2024, Short Papers, Contributed Sessions,* ISBN: 9783031644474

Casa, A., Murphy, T.B. & Fop. M. (2023). Partial membership models for high-dimensional spectroscopy data. *CLADAG 2023 - Book of Abstracts and Short Papers*. ISBN: 9788891935632

Ferraccioli, F., **Casa, A.** & Stefanucci, M. (2022). Trend filtering for functional regression. *Book of the Short Papers, Pearson, Caserta, 22.6.2022 - 24.6.2022*, ISBN: 9788891932310

Casa, A., Cappozzo, A. & Fop, M. (2022). Group-wise penalized estimation schemes in model-based clustering. *Book of the Short Papers. Pearson, Caserta, 22.6.2022 - 24.6.2022*, ISBN: 9788891932310

Cappozzo, A., **Casa, A.** & Fop, M. (2021). Model-based clustering with sparse matrix mixture models. *CLADAG 2021 - Book of abstract and short papers.* DOI: 10.36253/978-88-5518-340-6

Cappozzo, A., **Casa, A.** & Fop, M. (2021). Penalized model-based clustering for three-way data structures. *Book of short papers - SIS 2021.* ISBN 9788891927361

Casa, A., O'Callaghan, T.F. & Murphy, T.B. (2021). Parsimonious modelling of spectroscopy data via a Bayesian latent variables approach. *Book of short papers - SIS 2021*. ISBN 9788891927361

Casa, A., Chacòn, J.E. & Menardi, G. (2019). Asymptotics for bandwidth selection in nonparametric clustering. *Cladag 2019 - Book of short papers.* ISBN 9788883171086

Pascali, G., **Casa, A.** & Menardi, G. (2019). Co-clustering TripAdvisor data for personalized recommendations. *Book of short Papers SIS 2019*. ISBN 978889191510.

Casa, A., Chacòn, J.E. & Menardi, G. (2018). On the choice of an appropriate bandwidth for modal clustering. *Book of short Papers SIS 2018*. ISBN 9788891910233

Casa, A. & Menardi, G. (2017). Signal detection in high energy physics via a semisupervised nonparametric approach. *Proceedings of the Conference of the Italian Statistical Society "Statistics and Data Sciences: new challenges, new generations"*. ISBN 9788864535210